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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/Gradation/2015-16

13.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B.B. Umesh,**
#385, Bettaulsur (P), Bangalore NorthTaluk.

Name of Work : Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015

Date of Testing : 13.03.2015

Material : WMM

Sample Location : WMM Mix Plant

Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	165	165	3.3	96.7	95-100
22.4	1580	1745	34.9	65.1	60-80
11.2	1123	2868	57.4	42.6	40-60
4.75	625	3493	69.9	30.1	25-40
2.36	455	3948	79.0	21.0	15-30
0.600	400	4348	87.0	13.0	8-22
0.075	350	4698	94.0	6.0	0-8

Note:

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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/Gradation/2015-16 13.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. B.B. Umesh,**
#385, Bettaulsur (P), Bangalore North Taluk.

Name of Work : Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015

Date of Testing : 13.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	160	160	3.2	96.8	95-100
22.4	1505	1665	33.3	66.7	60-80
11.2	1050	2715	54.3	45.7	40-60
4.75	715	3430	68.6	31.4	25-40
2.36	680	4110	82.2	17.8	15-30
0.600	400	4510	90.2	9.8	8-22
0.075	300	4810	96.2	3.8	0-8

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GRADATION FOR WMM
MORTH TABLE-400-11

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Agency : **Mr. B.B. Umesh,**
#385, Bettaulsur (P), Bangalore North Taluk.

Name of Work : Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015

Date of Testing : 13.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	190	190	3.8	96.2	95-100
22.4	1450	1640	32.8	67.2	60-80
11.2	1095	2735	54.7	45.3	40-60
4.75	655	3390	67.8	32.2	25-40
2.36	615	4005	80.1	19.9	15-30
0.600	425	4430	88.6	11.4	8-22
0.075	315	4745	94.9	5.1	0-8

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Reference : EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015

Date of Testing : 13.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	115	115	2.3	97.7	95-100
22.4	1505	1620	32.4	67.6	60-80
11.2	1020	2640	52.8	47.2	40-60
4.75	685	3325	66.5	33.5	25-40
2.36	625	3950	79.0	21.0	15-30
0.600	435	4385	87.7	12.3	8-22
0.075	350	4735	94.7	5.3	0-8

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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/AIV/2015-16 13.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	13.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	387	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	301	302	
4	Aggregate Impact value = percent fines	21.82	21.96	
	$100^* (W_2/W_1)$%			21.89

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/AIV/2015-16 13.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
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Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	13.03.2015

Sl No.	Details	Trial No.		Average
		1	2	
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	380	381	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	80	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	302	301	
4	Aggregate Impact value = percent fines	20.53	21.00	
	$100^* (W_2/W_1)\%$			20.76

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/S-T/2015-16 13.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	13.03.2015

Result : Flakiness Index = **11.63%**

Elongation Index = **13.26%**

Result : Combined Flakiness & Elongation index **24.89%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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Job No.: CTCE/BBMP/W.No.09/BBU/WMM/S-T/2015-16 13.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
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Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	13.03.2015

Result : Flakiness Index = **11.05%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index 24.95%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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T-2377

Job No: CTCE/BBMP/W.No.09/BBU/CSR-04/821g/SDBC(QB)/2015-16 20.04.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
*NAME OF THE WORK	:	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	22.04.2015
PERIOD OF TESTING	:	22.04.2015

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	86	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	44	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information is furnished by the Customer/Representative.

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VIDYARANI P.K.
Technical Manager

****

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Tele Fax : 23223227, Website : www.civiltechconsultants.com
E-mail : vishwanath.ia@civiltechconsultants.com / info@civiltechconsultants.com

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/AIV/2015-16 22.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	382	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	300	
4	Aggregate Impact value = percent fines $100^* (W_2/W_1)\%$	21.47	21.67	21.57

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/AIV/2015-16 22.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
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Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	380	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	78	79	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	300	301	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	20.63	20.79	**20.71**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Shape_T/2015-16 22.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.04.2015

Result : Flakiness Index = **12.38%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **26.28%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	22.04.2015

Result : Flakiness Index = **13.26%**

Elongation Index = **13.90%**

Result : Combined Flakiness & Elongation index **27.16%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Stripping/2015-16 23.04.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	23.04.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.1	3.20	96.80
2	3.2		
3	3.3		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Sp_Wa/2015-16 23.04.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	23.04.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2023	2024	2024	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1273	1274	1274	
4	Weight of saturated surface dry aggregate in air	W_3 g	2016	2017	2018	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	743	743	744	
6	Weight of oven dried aggregate	W_4 g	2005	2006	2003	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.699	2.700	2.692	2.697
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.739	2.740	2.748	2.742
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.55%	0.55%	0.75%	0.62%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Bitumen/2015-16 23.04.2015

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
NAME OF THE WORK	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
SAMPLE I/D	Roads at Sir M.V. Layout, Ward No.09, BBMP, Bangalore.
DATE OF TESTING	23.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	25	26.00
7. Bitumen content in %	5.00	5.20
8. Average	**5.10**	

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Bitumen/2015-16 23.04.2015

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
NAME OF THE WORK	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
SAMPLE I/D	Roads at Sir M.V. Layout, Ward No.09, BBMP, Bangalore.
DATE OF TESTING	23.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	27.15	5.72	5.72	94.28	90-100
4.75	253.6	53.39	59.11	40.89	35-51
2.36	56.32	11.86	70.96	29.04	24-39
1.18	52.32	11.01	81.98	18.02	15-30
0.3	26.35	5.55	87.52	12.48	9-19
0.075	38.15	8.03	95.56	4.44	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	34.12	7.20	7.20	92.80	90-100
4.75	262.3	55.34	62.54	37.46	35-51
2.36	57.36	12.10	74.64	25.36	24-39
1.18	43.26	9.13	83.76	16.24	15-30
0.3	24.32	5.13	88.89	11.11	9-19
0.075	29.25	6.17	95.07	4.93	3-8

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/AGG/2016-17 23.04.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP,
Agency	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the Work	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	23.04.2015

Total Weight of Sample: **5650** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	440	7.8	7.79	92.21	90-100	
4.75	2970	52.6	60.35	39.65	35-51	
2.36	780	13.8	74.16	25.84	24-39	
1.18	460	8.1	82.30	17.70	15-30	
0.3	390	6.9	89.20	10.80	9-19	
0.075	320	5.7	94.87	5.13	3-8	

Total Weight of Sample: **5600** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	380	6.8	6.79	93.21	90-100	
4.75	2955	52.8	59.55	40.45	35-51	
2.36	625	11.2	70.71	29.29	24-39	
1.18	430	7.7	78.39	21.61	15-30	
0.3	355	6.3	84.73	15.27	9-19	
0.075	490	8.8	93.48	6.52	3-8	

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Job No.: CTCE/BBMP/W.No.09/BBU/SDBC/Stability/2015-16 23.04.2015

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. B.B. Umesh,** #385, Bettaulsur (P), Bangalore North Taluk.
Name of the Work	:	Improvements & Asphalting at Sir M.V. Layout balance road in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/10(16711)WO/31/2015-16 Dated: 22.04.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	23.04.2015

The results of the tests conducted on the Semi Dense Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	8.70	8.90	8.2 Kn (min)
2	Marshal flow, mm	3.05	3.15	2 – 4
3	Percent air voids in Mineral Aggregate	3.95	4.05	3 – 5
4	Voids in Compacted Mix	13.50	13.70	13 – 15
5	Percent Voids filled with Bitumen	66.35	67.85	65 - 78
6	Density, g/cc	2.27	2.28	--

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